CLAIMS

1. A method for correcting non-uniformity in luminance of an image generated by a projector and displayed obliquely on a surface, wherein the projector has a plurality of pixels for use in generating images and each projector pixel subtends to a corresponding projected area on the screen, the method comprising the steps of:

identifying the projector pixel that subtends to the largest projected area on the screen;

determining a ratio between the projected area of each pixel and the largest projected area;

organizing the ratio determined for each pixel into an attenuation array;

modifying luminance information of an input image received by the projector by the ratios of the attenuation array; and

utilizing the modified luminance information to drive the projector such that the image produced on the screen is uniform in luminance.

2. The method of claim 1 further comprising the step of generating a homography that maps between a first coordinate system relative to the projector, and a second coordinate system relative to the surface, and wherein the step of identifying is based on the first projector to surface homography.

3. The method of claim 2 wherein

the first coordinate system includes an x_p coordinate and a y_p coordinate;

the projector to surface homography includes parameters h_7, h_8 and h_9;

the step of identifying comprises the step of calculating a value, w, for each pixel represented by coordinates x_p, y_p wherein w is equal to $\left|h_7 x_p + h_8 y_p + h_9\right|$ and determining which projector pixel has the smallest calculated value of w.

4. The method of claim 2 wherein the step of generating the projector to surface homography comprises the steps of:

capturing one or more images produced by the projector on the screen with a camera;

determining the coordinates of each of the at least four projector pixels in the first coordinate system, which is relative to the projector, and in a third coordinate system that is relative to the camera; and

processing the coordinates of the at least four projector pixels in both the first and third coordinate systems to generate the projector to surface homography.

5. The method of claim 4 wherein the camera has an optical axis that is perpendicular with the surface in all planes, and the step of generating the projector to surface homography comprises the steps of:

generating a projector to camera homography based upon the determination of the coordinates of the at least four projector pixels in both the first and third coordinate systems; and

equating the projector to camera homography with the projector to surface homography.